

What is claimed is:**1. An encoding method, comprising:**

generating convolutional code according to a predefined criteria and with reference to encoder's predefined convolutional encoding rate and
5 constraint length;

processing data to be transmitted by using the convolutional code so that the coded data are suitable for propagation in multipath fading channel with Rayleigh fading.

2. The method according to claim 1, further comprising:

10 setting said convolutional encoding rate and constraint length according to a specification in a communication protocol.

3. The method according to claim 1 or 2, wherein said predefined criteria is to maximize the sum of Euclidean distance between branches of a predefined number along the shortest error event path and the
15 corresponding branches of the predefined number along a correct decoding path, and the shortest error event path is a decoding path having the minimum branches of non-zero Euclidean distance compared with the correct decoding path.

4. The method according to claim 3, wherein said branches of the
20 predefined number are all the branches constructing the shortest error event path and all the branches constructing the correct decoding path.

5. The method according to claim 4, wherein said sum of Euclidean distance is statistical sum of Euclidean distance when QPSK modulation scheme is adopted in said communication protocol.

25 6. The method according to claim 5, wherein said coded data are also suitable for propagation in AWGN channel with Gaussian noise.

7. The method according to claim 5 or 6, wherein said convolutional code can be any one of the following code:

G_0, G_1, G_2 : 535,652,745;

G_0, G_1, G_2 : 535,652,715;

G_0, G_1, G_2 : 527,652,761;

G_0, G_1, G_2 : 525,676,725;

5 G_0, G_1, G_2 : 525,676,724;

G_0, G_1, G_2 : 535,653,725;

G_0, G_1, G_2 : 535,653,724.

8. A convolutional decoding method, comprising:

10 receiving data processed with convolutional code generated according to a predefined criteria via multipath fading channel;

decoding the received data by using convolutional decode corresponding to the convolutional code, so that the decoded data can be gotten rid of Rayleigh fading during propagation via the multipath fading channel.

15 9. The method according to claim 8, wherein said predefined criteria is to maximize sum of Euclidean distance between branches of a predefined number along the shortest error event path and corresponding braches of the predefined number along a correct decoding path, and the shortest error event path is a decoding path having the minimum branches of non-zero
20 Euclidean distance compared with the correct decoding path.

10. The method according to claim 8 or 9, wherein said branches of the predefined number are all branches constructing the shortest error event path and all branches constructing the correct decoding path.

15 11. The method according to claim 10, wherein said sum of Euclidean distance is statistical sum of Euclidean distance when said received data adopt QPSK modulation scheme.

12. The method according to claim 11, wherein said decoded data can be gotten rid of Gaussian noise during propagation via a AWGN channel.

13. The method according to claim 11 or 12, wherein said decode is any one of the following:

G_0, G_1, G_2 : 535,652,745;

G_0, G_1, G_2 : 535,652,715;

5 G_0, G_1, G_2 : 527,652,761;

G_0, G_1, G_2 : 525,676,725;

G_0, G_1, G_2 : 525,676,724;

G_0, G_1, G_2 : 535,653,725;

G_0, G_1, G_2 : 535,653,724.

0 14. An encoder, comprising:

an encoding module, for processing data to be transmitted by using convolutional code so that the coded data are suitable for propagation in multipath fading channel with Rayleigh fading, wherein the convolutional code is generated according to a criteria of maximizing sum of Euclidean distance between each branch along the shortest error event path and each corresponding branch along a correct decoding path, and the shortest error event path is a decoding path having the minimum branches of non-zero Euclidean distance compared with the correct decoding path.

5 15. The encoder according to claim 14, wherein said sum of Euclidean distance is statistical sum of Euclidean distance when QPSK modulation scheme is adopted in said communication protocol.

0 16. The encoder according to claim 15, wherein said convolutional code can be any one of the following code:

G_0, G_1, G_2 : 535,652,745;

5 G_0, G_1, G_2 : 535,652,715;

G_0, G_1, G_2 : 527,652,761;

G_0, G_1, G_2 : 525,676,725;

G_0, G_1, G_2 : 525,676,724;

G_0, G_1, G_2 : 535,653,725;

G_0, G_1, G_2 : 535,653,724.

17. A decoder, comprising:

5 a decoding module, for decoding received data processed with convolutional code by using convolutional decode, so that the decoded data can be gotten rid of the Rayleigh fading during propagation via multipath fading channel, wherein the convolutional decode corresponds to the convolutional code and the convolutional code is generated according to a criteria of maximizing the sum of Euclidean distance between each branch along the shortest error event path and each corresponding branch along a correct decoding path, and the shortest error event path is a decoding path having the minimum branches of non-zero Euclidean distance compared with the correct decoding path.

10 18. The decoder according to claim 17, wherein said sum of Euclidean distance is the statistical sum of Euclidean distance when QPSK modulation scheme is adopted in said communication protocol.

19. The decoder according to claim 18, wherein said decode is any one of the following:

20 G_0, G_1, G_2 : 535,652,745;

G_0, G_1, G_2 : 535,652,715;

G_0, G_1, G_2 : 527,652,761;

G_0, G_1, G_2 : 525,676,725;

G_0, G_1, G_2 : 525,676,724;

G_0, G_1, G_2 : 535,653,725;

25 G_0, G_1, G_2 : 535,653,724.

20. A UE (User Equipment), comprising:

an encoder, for processing data to be transmitted by using

convolutional code so that the coded data are suitable for propagation in multipath fading channel with Rayleigh fading, wherein the convolutional code is generated according to a criteria of maximizing the sum of Euclidean distance between each branch along the shortest error event path and each corresponding branch along a correct decoding path, wherein the shortest error event path is a decoding path having the minimum branches of non-zero Euclidean distance compared with the correct decoding path;

a transmitting unit, for transmitting the coded data.

21. The UE according to claim 20, wherein the convolutional code is any one of the following:

G_0, G_1, G_2 : 535,652,745;

G_0, G_1, G_2 : 535,652,715;

G_0, G_1, G_2 : 527,652,761;

G_0, G_1, G_2 : 525,676,725;

G_0, G_1, G_2 : 525,676,724;

G_0, G_1, G_2 : 535,653,725;

G_0, G_1, G_2 : 535,653,724.

22. The UE according to claim 21, further comprising:

a receiving unit, for receiving data processed with convolutional code from a network system;

a decoder, for decoding the received data by using convolutional decode corresponding to the convolutional code of the network system, so that the decoded data can be gotten rid of the Rayleigh fading during propagation via multipath fading channel, wherein the convolutional code is generated according to a criteria of maximizing the sum of Euclidean distance between each branch along the shortest error event path and each corresponding branch along a correct decoding path, wherein the shortest error event path is a decoding path having the minimum branches of non-zero Euclidean distance compared with the correct decoding path.

23. The UE according to claim 22, wherein said decode is any one of the following:

G_0, G_1, G_2 : 535,652,745;

G_0, G_1, G_2 : 535,652,715;

5 G_0, G_1, G_2 : 527,652,761;

G_0, G_1, G_2 : 525,676,725;

G_0, G_1, G_2 : 525,676,724;

G_0, G_1, G_2 : 535,653,725;

G_0, G_1, G_2 : 535,653,724.

10 24. A network system, comprising:

an encoder, for processing data to be transmitted by using convolutional code so that the coded data are suitable for propagation in multipath fading channel with Rayleigh fading, wherein the convolutional code is generated according to a criteria of maximizing the sum of Euclidean distance between each branch along the shortest error event path and each corresponding branch along a correct decoding path, and the shortest error event path is a decoding path having the minimum branches of non-zero Euclidean distance compared with the correct decoding path;

a transmitting unit, for transmitting the coded data.

20 25. The network system according to claim 24, wherein said convolutional code is any one of the following:

G_0, G_1, G_2 : 535,652,745;

G_0, G_1, G_2 : 535,652,715;

G_0, G_1, G_2 : 527,652,761;

25 G_0, G_1, G_2 : 525,676,725;

G_0, G_1, G_2 : 525,676,724;

G_0, G_1, G_2 : 535,653,725;

G_0, G_1, G_2 : 535,653,724.

26. The network system according to claim 25, further comprising:

a receiving unit, for receiving data processed with convolutional code from the UE;

5 a decoder, for decoding the received data by using convolutional decode corresponding to the convolutional code of the UE, so that the decoded data can be gotten rid of the Rayleigh fading during propagation via the multipath fading channel, wherein the convolutional code is generated according to a criteria of maximizing the sum of Euclidean distance between each branch along the shortest error event path and each
0 corresponding branch along a correct decoding path, and the shortest error event path is a decoding path having the minimum branches of non-zero Euclidean distance compared with the correct decoding path.

27. The network system according to claim 26, wherein said decode is any one of the following:

5 G_0, G_1, G_2 : 535,652,745;
 G_0, G_1, G_2 : 535,652,715;
 G_0, G_1, G_2 : 527,652,761;
 G_0, G_1, G_2 : 525,676,725;
 G_0, G_1, G_2 : 525,676,724;
10 G_0, G_1, G_2 : 535,653,725;
 G_0, G_1, G_2 : 535,653,724.